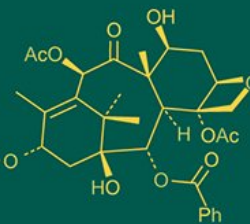
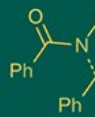
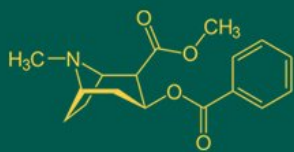


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Evaluation of vegetative, flowering and bulb parameters of different tuberose cultivars for pot culture

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Abstract

The present investigation entitled "Evaluation of vegetative, flowering and bulb parameters of different tuberose cultivars for pot culture" was conducted during *Kharif* 2025-26 at Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The experiment was conducted in Randomized Block Design (RBD) with eight cultivars and three replications under pot culture conditions. Significant variation was observed among cultivars for vegetative, flowering and bulb characters. Sahayadri Vaman (T_1) recorded the minimum plant height (36.21 cm), earliest spike initiation (66.66 days), shortest spike (42.60 cm) and rachis length (23.34 cm), along with desirable floret weight (1.84 g) and floret diameter (41.90 mm). Pratap Rajani (T_7) ranked second for pot culture suitability. BRH-17 (T_2) recorded the maximum spikes per clump (4.06) and floret diameter (43.49 mm), while Pratap Rajani 7-1 (T_8) recorded the longest spike (73.77 cm), rachis (42.96 cm) and maximum flowering duration (27.66 days). BRH-24 (T_4) recorded the maximum bulb diameter (47.41 mm), bulblets per clump (21.93) and total bulb weight per clump (202.66 g). Overall, Sahayadri Vaman and Pratap Rajani were found most suitable for ornamental pot culture under the agro-climatic conditions of Chhattisgarh.

Keyword: tuberose, cultivar, evaluation, pot culture, flowering

Introduction

Tuberose (*Agave amica*) is an important commercial floricultural crop valued for its fragrant flowers, which are widely used for loose flowers, cut flowers, garlands, floral decorations and essential oil extraction. It belongs to the family Asparagaceae and is native to Mexico. Based on floral morphology, tuberose cultivars are classified into single, semi-double and double types. Tuberose is extensively cultivated in India, including Chhattisgarh, where favourable climatic conditions and increasing market demand have promoted its commercial cultivation. The crop performs well under warm conditions (20-35°C), open sunlight and well-drained fertile soils. However, extreme temperatures may adversely affect flowering and flower quality. With increasing urbanization and limited space, pot culture and container gardening are gaining popularity. Tuberose has good potential as a potted ornamental crop due to its attractive foliage and fragrant flowers. Cultivar suitability for pot culture depends on traits such as compact growth, plant height, spike length, flowering duration, flower quality and bulb multiplication. Therefore, evaluation of different cultivars is essential to identify suitable genotypes for ornamental pot production under local conditions.

Materials and Methods

The present investigation was conducted at the Horticultural Nursery, Horticultural Research cum Instructional Farm, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during 2025-2026. The experimental site is situated at an altitude of about 289.56 m above mean sea level and experiences a sub-humid to semi-arid climate. The region receives an average annual rainfall of 1200-1400 mm, mostly during the southwest monsoon period from mid-June to September. The summer temperature generally reaches 42-46°C, whereas winter temperature falls to 7-9°C. The experiment was laid out in Randomized Block Design (RBD) with eight tuberose cultivars viz., Sahayadri Vaman, BRH-17, BRH-18, BRH-24, Arka Sugandhi, GKTC-4, Pratap Rajani and Pratap Rajani 7-1, replicated three times under open-field pot culture conditions. Each replication consisted of

five pots per treatment, making a total of 120 pots. Healthy and uniform-sized tuberose bulbs measuring 2.5-3.0 cm in diameter were used as planting material. Before planting, the bulbs were treated with 0.1 per cent Bavistin solution for 30 minutes and shade dried. The bulbs were planted in pots during July at a depth of 5-6 cm in growing media consisting of soil, sand and farmyard manure in a 1:1:1 ratio. Recommended nutrient management was followed using urea, DAP and MOP, along with water-soluble NPK (19:19:19) and cow dung slurry. Irrigation, weeding, soil loosening and plant protection measures were carried out as and when required. Observations were recorded on vegetative, flowering and bulb characters. The data recorded on different characters were subjected to statistical analysis using the procedure suggested by Panse and Sukhatme for Randomized Block Design. The treatment means were compared using the critical difference at the 5 per cent level of significance.

Result and Discussion

Data on different growth, flowering and bulb parameters of tuberose cultivars were recorded under pot culture conditions and are presented and discussed in this section.

Growth parameters

The data presented in Table 1 clearly indicated that significant variation was observed among different tuberose

cultivars with respect to plant height at 90 days after planting. The cultivar Sahayadri Vaman recorded minimum plant height (36.21 cm), which was statistically *at par* with Pratap Rajani (40.02 cm), BRH-18 (41.54 cm) and GKTC-4 (42.71 cm), while the maximum plant height was recorded in BRH-17 (50.50 cm). The shorter plant height of Sahayadri Vaman is a desirable characteristic for pot culture as it provides a compact plant architecture. The number of leaves per plant also varied significantly among the cultivars. The maximum number of leaves per plant was recorded in BRH-24 (47.80), which was significantly superior over the other cultivars, whereas the minimum number of leaves was recorded in GKTC-4 (22.66).

The variation in Plant height and leaf production may be mainly due to differences in the genetic constitution of individual cultivars, which influence vegetative growth and development. Environmental conditions and nutrient availability may also affect leaf production by influencing physiological processes such as photosynthesis and nutrient uptake. Similar variation in the number of leaves per plant among tuberose cultivars was also reported by Patil *et al.* (2009) ^[11], Mahawer *et al.* (2013) ^[10], Ranchana *et al.* (2013) ^[13], Prashanta *et al.* (2016) ^[12], Singh *et al.* (2017) ^[17], Chaudhary *et al.* (2018) ^[2], Chormale (2019) ^[3], Kamei and Singh (2019) ^[7], Chormale (2019), Suralkar *et al.* (2022) ^[18], Kispotta and Tamrakar (2024) ^[8, 19], and Tamrakar and Sunar (2025) ^[20] in tuberose.

Table 1: Effect of different tuberose cultivars on growth parameters under pot culture conditions

Tr.no.	Treatment	Plant Height (cm)	Number of Leaves per Plant
T1	Sahayadri Vaman	36.21 ^a	29.94 ^{cd}
T2	BRH - 17	50.50 ^c	44.00 ^{ab}
T3	BRH - 18	41.54 ^{ab}	34.00 ^{bc}
T4	BRH - 24	45.14 ^{bc}	47.80 ^a
T5	Arka Sugandhi	46.71 ^{bc}	25.00 ^d
T6	GKTC - 4	42.71 ^{ab}	22.66 ^e
T7	Pratap Rajani	40.02 ^{ab}	25.00 ^d
T8	Pratap Rajani 7-1	44.70 ^{bc}	37.20 ^{bc}
	SE(m) ±	2.38	1.23
	CD at 5%	7.30	3.75

Flowering parameters

The data pertaining to flowering parameters viz., days to 50% spike initiation, flowering duration, spike length, rachis length, number of florets per spike, floret diameter and cut spike diameter of different tuberose cultivars are presented in Tables 2. Significant variation was observed among the cultivars for all the flowering parameters. The earliest 50% spike initiation was recorded in Sahayadri Vaman (66.66 days), which was *at par* with BRH-24 (67.00 days), whereas the maximum days were recorded in Pratap Rajani 7-1 (104.33 days). The maximum flowering duration was observed in Pratap Rajani 7-1 (27.66 days), which was *at par* with BRH-24 and Sahayadri Vaman, while the minimum was recorded in Arka Sugandhi (16.66 days). The shortest spike (42.60 cm) and rachis length (23.34 cm) were recorded in Sahayadri Vaman, whereas the maximum spike length (73.77 cm) and rachis length (42.96 cm) were recorded in Pratap Rajani 7-1.

The maximum number of florets per spike (43.44) was recorded in Pratap Rajani 7-1, which was *at par* with Sahayadri Vaman, GKTC-4, BRH-17, Pratap Rajani and Arka Sugandhi, while the minimum was recorded in BRH-18 (32.30). The maximum floret diameter (43.49 mm) was recorded in BRH-17, which was *at par* with Sahayadri Vaman and BRH-24, whereas the minimum was observed in Pratap Rajani (32.71 mm). The maximum cut spike diameter (90.39 mm) was recorded in Pratap Rajani, which was *at par* with Pratap Rajani 7-1. while the minimum was recorded in BRH-18 (61.15 mm).

The variation in flowering behaviour may be attributed to differences in genetic constitution and environmental response. Similar results were reported by Mahawer *et al.* (2013) ^[10], Kumar *et al.* (2019), Jadhav *et al.* (2020) ^[6], Das *et al.* (2022) ^[4], Rajput *et al.* (2022) ^[14], Harshavardhan *et al.* (2023) ^[5], and Singh *et al.* (2023) ^[15].

Table 2: Effect of different tuberose cultivars on flowering parameters under pot culture conditions

Tr.no.	Treatment	Days to 50% Spike Initiation	Flowering Duration (Days)	Spike Length (cm)	Rachis Length (cm)	Number of Florets per Spike	Diameter of Florets (mm)	Diameter of Cut Spike (mm)
T1	Sahayadri Vaman	66.66 ^a	26.00 ^{ab}	42.60 ^a	23.34 ^a	43.09 ^a	41.90 ^{ab}	78.73 ^b
T2	BRH - 17	81.00 ^b	23.66 ^{bc}	54.62 ^b	25.46 ^a	41.76 ^a	43.49 ^a	79.95 ^b
T3	BRH - 18	91.66 ^c	24.66 ^{bc}	62.01 ^c	30.20 ^b	32.30 ^b	36.07 ^c	61.15 ^c
T4	BRH - 24	67.00 ^a	26.33 ^{ab}	67.53 ^d	32.01 ^b	33.04 ^b	40.90 ^{ab}	62.60 ^c
T5	Arka Sugandhi	76.00 ^b	16.66 ^d	59.06 ^c	25.45 ^a	41.13 ^a	36.81 ^{bc}	75.93 ^b
T6	GKTC - 4	93.33 ^c	23.00 ^c	52.01 ^b	23.68 ^a	42.24 ^a	35.28 ^c	81.19 ^b
T7	Pratap Rajani	102.00 ^d	23.00 ^c	50.91 ^b	28.98 ^{ab}	41.66 ^a	32.71 ^c	90.39 ^a
T8	Pratap Rajani 7-1	104.33 ^d	27.66 ^a	73.77 ^e	42.96 ^c	43.44 ^a	36.79 ^{bc}	87.49 ^a
	SE(m) ±	2.25	1.02	1.32	1.88	1.04	1.67	2.98
	CD at 5%	6.10	3.13	4.06	5.75	3.20	5.12	6.14

Yield parameters

The data pertaining to yield parameters viz., weight of individual floret, total weight of florets per spike, number of spikes per clump, weight of individual bulb, total bulb weight per clump, weight of individual bulblet and total bulblet weight per clump in different tuberose cultivars are presented in Tables 3. Significant variation was observed among the cultivars for all the yield parameters studied. The maximum individual floret weight (1.84 g) and total floret weight per spike (74.28 g) were recorded in Sahayadri Vaman, whereas the minimum values were recorded in GKTC-4 (0.69 g and 28.66 g, respectively). The maximum number of spikes per clump (4.06) was recorded in BRH-17, while the minimum was observed in GKTC-4 (2.20).

Among bulb yield parameters, BRH-24 recorded the maximum individual bulb weight (25.33 g) and total bulb weight per clump (202.66 g), while the minimum total bulb weight per clump was recorded in Pratap Rajani (91.20 g). The maximum individual bulblet weight (3.32 g) was recorded in BRH-17, whereas the maximum total bulblet weight per clump (65.00 g) was recorded in BRH-24. The variation in floral yield parameters may be attributed to differences in genetic constitution, floret size, number of florets, bulb, bulblet yield and assimilate accumulation. Similar variation was reported by Jadhav *et al.* (2013), Mahawer *et al.* (2013) [10], Singh *et al.* (2013), Chaturvedi *et al.* (2014) and Patil *et al.* (2018), Harshvardhan *et al.* (2023), Tamrakar and Alka (2023), and Singh *et al.* (2023) [15], in tuberose.

Table 3: Effect of different tuberose cultivars on yield parameters under pot culture conditions

Tr. No.	Treatment	Weight of Individual Floret (g)	Weight of Total Florets per Spike (g)	Number of Spikes per Clump	Weight of Individual Bulb (g)	Weight of Total Bulbs per Clump (g)	Weight of Individual Bulblet (g)	Weight of Total Bulblets per Clump (g)
T1	Sahayadri Vaman	1.84 ^a	74.28 ^a	3.10 ^b	19.20 ^{bc}	115.20 ^f	2.20 ^{ef}	20.60 ^c
T2	BRH - 17	1.24 ^d	50.84 ^c	4.06 ^a	25.19 ^a	155.33 ^c	3.32 ^a	31.33 ^d
T3	BRH - 18	1.69 ^b	62.16 ^b	3.00 ^b	12.95 ^c	131.26 ^e	3.12 ^{ab}	49.93 ^b
T4	BRH - 24	1.34 ^c	43.59 ^d	2.40 ^c	25.33 ^a	202.66 ^a	2.80 ^{bc}	65.00 ^a
T5	Arka Sugandhi	0.86 ^f	35.01 ^e	3.06 ^b	24.60 ^a	145.90 ^b	2.69 ^{cd}	43.06 ^b
T6	GKTC - 4	0.69 ^g	28.66 ^f	2.20 ^c	18.24 ^{bc}	126.46 ^c	2.49 ^{de}	33.80 ^c
T7	Pratap Rajani	0.89 ^f	37.66 ^e	2.86 ^b	15.62 ^c	91.20 ^g	2.70 ^{cd}	27.46 ^d
T8	Pratap Rajani 7-1	0.98 ^e	42.28 ^d	3.20 ^b	20.25 ^b	175.53 ^b	2.50 ^{de}	46.26 ^b
	SE(m)±	0.01	0.33	0.12	1.23	2.24	0.11	0.48
	CD at 5%	0.03	1.03	0.36	3.46	6.37	0.33	1.47

Bulb parameters

The data pertaining to bulb parameters viz., diameter of bulb, diameter of individual bulblet, number of bulbs per clump, number of bulblets per clump and bulb length in different tuberose cultivars are presented in Table 4. Significant variation was observed among the cultivars for most of the bulb parameters, whereas diameter of individual bulblet showed non-significant variation.

The maximum bulb diameter (47.41 mm) was recorded in BRH-24, which was *at par* with Arka Sugandhi and BRH-18, whereas the minimum was observed in Pratap Rajani

(36.63 mm). The diameter of individual bulblet showed non-significant variation, with the maximum numerical value recorded in GKTC-4 (17.98 mm) and the minimum in Sahayadri Vaman (15.34 mm). The maximum number of bulbs per clump (10.13) was recorded in BRH-18, whereas the minimum was recorded in Pratap Rajani (5.73). Similarly, the maximum number of bulblets per clump (21.93) was recorded in BRH-24, while the minimum (9.60) was recorded in Sahayadri Vaman and Pratap Rajani.

The maximum bulb length (8.09 cm) was recorded in Arka Sugandhi, which was *at par* with BRH-17, BRH-24,

Sahayadri Vaman and GKTC-4, whereas the minimum was recorded in Pratap Rajani (6.08 cm). The variation in bulb and bulblet characters may be attributed to differences in genetic constitution, assimilate accumulation, nutrient utilization and bulb multiplication ability of the cultivars.

Similar variation in bulb characters of tuberose was reported by Chaturvedi *et al.* (2014) ^[1], Prashanta *et al.* (2016) ^[12], Patil *et al.* (2018), Mahawer *et al.* (2013) ^[10], and Harshvardhan *et al.* (2023).

Table 4: Effect of different tuberose cultivars on bulb parameters under pot culture conditions

Tr. No.	Treatment	Diameter of Bulb	Diameter of Bulblet(mm)	Length of Bulb (cm)	Number of Bulbs per	Number of Bulblets per Clump
T1	Sahayadri Vaman	37.11 ^{cd}	15.34	7.49 ^{ab}	6.13 ^e	9.60 ^f
T2	BRH - 17	41.47 ^{bc}	17.22	7.92 ^a	5.93 ^f	10.06 ^e
T3	BRH - 18	44.48 ^{ab}	16.22	6.56 ^{bc}	10.13 ^a	16.00 ^c
T4	BRH - 24	47.41 ^a	17.50	7.61 ^{ab}	8.00 ^c	21.93 ^a
T5	Arka Sugandhi	44.85 ^{ab}	17.08	8.09 ^a	5.93 ^f	16.00 ^c
T6	GKTC - 4	39.77 ^{cd}	17.98	7.22 ^{ab}	6.93 ^d	12.66 ^d
T7	Pratap Rajani	36.63 ^d	17.42	6.08 ^c	5.73 ^g	9.60 ^f
T8	Pratap Rajani 7-1	41.55 ^{bc}	17.86	6.55 ^{bc}	8.26 ^b	19.20 ^b
	SE(m)±	1.46	0.67	0.36	0.05	0.14
	CD at 5%	4.47	N/S	1.12	0.17	0.45

Conclusion

Based on the overall performance, Sahayadri Vaman (T₁) was found most suitable for pot culture due to its compact growth, early flowering, shorter spike and rachis length with desirable floral traits. Pratap Rajani (T₇) ranked second in suitability. BRH-24 (T₄) performed superior for bulb production. Thus, Sahayadri Vaman and Pratap Rajani can be recommended for pot culture under Chhattisgarh conditions.

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